

Fondazione per Adroterapia Oncologica – TERA

Novara - Italy

“LINAC FOR ION BEAM ACCELERATION”

Abstract

A drift tube (15) linear accelerator (linac) (4) that can be used for the acceleration of low energy ion beams is disclosed. The particles enter the linac (4) at low energy and are accelerated and focused along a straight line in a plurality of resonant accelerating structures (8) interposed by coupling structures (9) up to the desired energy, for instance for therapeutic needs. In the accelerating structures (8), excited by an H-type resonant electromagnetic field, a plurality of accelerating gaps (20) is provided between said drift tubes (15), said drift tubes being supported by stems, for instance alternatively horizontally (16) and vertically (17) disposed. A basic module (7) is disclosed, composed of two accelerating structures (8) and an interposed coupling structure (9), or if necessary a modified coupling structure (9A) connected to a RF power generator (11), being linked if necessary to a vacuum system (13) and equipped if necessary with one or more quadrupoles (18). Said basic module (7) can be expanded to get modules (7A) that present an odd number n of coupling structures (9, 9A) which still if necessary are equipped with one or more quadrupoles (18), and an even number $N = n + 1$ of accelerating structures (8). The proposed linac (4) contains one or more modules (7, 7A) and allows obtaining a large accelerating gradient and a very compact structure.

(Fig. 1)